Paper/Work

JUNE 13, 2012
VOLUME 1, ISSUE 17

LAWRENCE LIVERMORE POSTDOC ASSOCIATION

MARTIAL ARTS AT THE LAB

By Adam Sorini

It has been said that a healthy worker is a happy worker and a happy worker is a productive worker. And personally, as a physical scientist, I've never been happier than when I'm punching a computer scientist in the face. This is actually a fairly regular occurrence during martial arts training sessions on the LLNL campus. Punching and kicking has the additional benefit of burning calories, building strength, stretching muscles, and can generally lead to good health. Martial arts activities at LLNL have been organized into the Martial Arts Networking Group (MANG), which is one of the many networking groups under the LLESA umbrella. The MANG is made up of members of the LLNL community who are interested in martial arts and who have varying degrees of skill, from freshly minted whitebelts to battle-hardened black belts.

There are currently a number of different martial arts groups associated with the MANG, but the two most active groups seem to be the Kajukenbo group, led by Dennis Peterson, and the Kali group, led by Jim Collins. These groups train at the lab every day, and they are the most likely entry point to the MANG for new members, such as curious postdoctoral researchers.

You might have a latent familiarity with terms like "karate" or "jujitsu", but perhaps you have never before heard of either "Kajukenbo" or "Kali." Kali (also known as "Escrima") is a weapons-based art that begins by teaching students how to attack and defend using sticks and knives. The Kali group has three regular students who can be found working out, practicing forms, or lightly sparring with sticks and (wooden, plastic, and aluminum) knives on Mondays, Wednesdays, and Fridays from noon to 1PM. Kajukenbo is a mixed martial art that draws techniques from Karate, Judo, Kenpo, and Boxing—hence the name Ka-Ju-Ken-Bo—as well as other martial arts. The Kajukenbo group has about 20 active students who work out from noon to 1PM every day of the week. After a short cross-fit style warm-up, the Kajukenbo group typically goes through partner-based boxing and

MARTIAL ARTS AT THE LAB, CONTINUED

kickboxing drills to further warm-up the arms and legs by striking focus mitts and muay-thai pads with punches, kicks, elbows, and knees. This group also practices a set of specialized self-defense techniques that make up the core of the system, and occasionally engages in light sparring.

The MANG has its own workout room on the LLNL campus in T4675 Suite H (the southwest corner of 4675), which consists of about 800 square feet of carpeted floor space. Close to a third of the floor space is covered in tumbling/wrestling mats. A full-length mirror runs along one side of the room, which is useful for perfecting one's formal martial arts movements. Punching and kicking bags line the walls and there is even a wooden Wing Chun dummy standing guard in the corner.

Both new and advanced students of the martial arts are welcome to participate in the MANG. If you want to check it out, stop by building T4675-H any day of the week between noon and 1PM to observe a training session. And please remember to remove your shoes before stepping onto the dojo floor, grasshopper.

NOTES FROM THE LLPA COUNCIL MEETING ON MAY 31

Start: 12 PM, B543 Good Earth Room. Attendees: Andre S., Nathan K., Kris K., Christine Z., Abhinav B., Charles R., Heather W., Kirsten H., Liam S., David A., David M., Nick B.

1.) Roles/VP/bylaws/general points:

* Nathan shared his thoughts on roles in the council
* idea: create a "library of events" to keep track of what was necessary to organize certain things; Kirsten will summarize that for the movie night
* Heather suggested that the LLPA should connect better to the new hires
* connection to the Leadership institute: will be handled by Christine and Kris, maybe suggest a Pizza lunch?

2.) Lightning talks:

* great turnout, we had 6 speakers (1 from toastmasters, 5 postdocs)
* managed to stay exactly in time
* future session scheduled every third Friday of each month

3.) Tea time:

* not much response from the postdoc community so far
* will obtain input regarding the interest of the postdocs after the next lightning talks

4.) Karaoke:

* event set up for June, 8th; Sandia postdocs are informed

5.) BBQ:

* date fixed for 7/13
* money for meat will be provided by Kris and Christine
* Nathan will update the poster
* ticket prices: 3$ (Postdocs, students, ...) or $5 (Non-postdocs)
* volunteers: Nathan (grilling), Nick (flexible), David M. (cleanup), Liam (setup, early things), Kirsten, Heather, Abhinav (post the info and sell tickets), Andre/Charles (flexible), Christine/Kris (shopping and setup)

6.) Soccer:

* not enough feedback for having it at The Vine
* will go to Rockhouse or Alehouse instead
* connecting to Sandia as well

7.) Newsletter:

* different articles in the queue (interview with Donna Crawford, martial arts, Thomas brownbag)
* another interview should be planned for the second half of June (maybe Ed Moses?, retirees?)
* Nick took over the career development part

8.) Web Team:

* Abhinav has three sources for the template
* first step: move current content to new template (by end of June)
* Nathan pointed out that another person should be deeply involved to ensure redundancy (Charles?)
* Abhinav needs pictures

9.) Brown bags:

* PG&E will send a "technical" speaker
* list of ideas has been sent to Amy

10.) Poster Symposium:

* location: old and new cafeteria from 2.30 - 5.30 pm
* help will be needed with posting numbers
* help will be needed with registration and check-in
* social event after: Blacksmith Square/Tap 25

COMMENTS/SUGGESTIONS/PRAISE/COMPLAINTS?

Please send your feedback to the Editor (Nathan Kugland, kugland1@llnl.gov).

NEXT STEPS: INTERVIEWS WITH FORMER POSTDOCS

Interview conducted by David Alessi.

When was the end of your postdoc?

Nina Rohringer: August 2009.

Where do you work now and how is that similar or different from what you did as a postdoc?

My postdoc position transferred to a staff scientist (flexterm in LLNL language) at Lawrence Livermore. My work did not really change, since I was already PI of a project during my postdoc. Then, in February 2011, I took a new position as a group leader at the Max Planck Institute, with location at the recently founded CFEL (Center for free-electron laser science) at DESY, Hamburg. At my new position I have more responsibilities and also have students and postdocs to supervise. Despite the additional responsibilities, my working style did not change considerably from LLNL. Fortunately, I don't have many administrative tasks. My group is situated at a big German National Lab (DESY), and the setting is pretty similar to LLNL. The DESY lab, however, has strong links to the university – it's an open campus, and parts of the physics department of the university are situated on campus. It's easier to attract students from the university to join research activities as Ph.D's, and that's a big advantage.

Did you apply elsewhere? Why did you make this particular choice (lab vs. academia vs. industry)?

I did not apply elsewhere. I actually was quite happy at LLNL and was not actively looking for new positions. I got the opportunity to lead a small research group and to follow up on my research ideas independently and with ample funding. That's an offer that few people would refuse.

What did you enjoy the most and the least about being a postdoc at LLNL? What do you think are the differences between a postdoc at the Lab versus at a university?

I liked my time as a postdoc at LLNL, since I was given the liberty to follow my own ideas and to develop my own research portfolio. I was encouraged to get my own funding for my project and was basically independent and treated like any other Lab scientist. I think this wouldn't be possible to that extent at a university, where most postdocs would start on projects that are well-defined by their supervisors and have less opportunity to lead and create their own projects. The Labwide LDRD program at LLNL is great for postdocs to start up their own research — there are probably no comparable funding opportunities for postdocs at universities, to kick start their independent research. Another difference between a postdoc position at the Lab versus at a university is the salary. It was also encouraging to know, when I joined the Lab, that there might be a possibility of getting a staff scientist position at the Lab, in contrast to most other places, where a postdoc position is considered an "in and out" career step.

The main drawbacks at LLNL are that there are only a few possibilities to work with students and it is difficult at the lab to develop teaching experience.

How far along your postdoc were you when you decided what the next step in your career would be?

I was a postdoc for almost 4 years before becoming a staff scientist. Before coming to LLNL, I spent two postdoc years at Argonne National Lab. It felt pretty natural to me to stay in science and academia, since I really enjoyed what I was doing. Therefore, the question of whether or not to do something else never came up. After my Ph.D., I shortly considered a career in the finance industry or as a strategy consultant. But my first postdoc experience was inspiring enough that I dropped these ideas of alternative career paths pretty soon.

Can you describe the application and interview process? How did you get your new job? What do you think your employer valued the most in your formation and experience?

I was invited to apply for the position of a Max Planck group leader. I was not actively looking for a job at that time, since I was quite happy at LLNL. I had to provide a 5-year research plan, and external reviewers evaluated this proposal. I then was invited to an interview and got an offer. I think that the employer valued that I had my own independent research and followed up on my ideas. I got my own funding, chose the team of collaborators and successfully completed the project.

CAREER RESOURCES

Upcoming events:

June 26, 11 am – 12 pm:
PLS postdoc seminar series
B151 R1209 (Stevenson Room)
Joseph McKeown, CMMD
Tomorr Haxhimali, CMMD

July 17, 2:30-5:30 pm (Note date change):
5th Annual Institutional Postdoctoral Poster Symposium.
Register to present at:
https://symposium.llnl.gov/postdoc

Beware the Creeping Cracks of Bias
Daniel Sarewitz, May 2012, Nature

"Nothing will corrode public trust more than a creeping awareness that scientists are unable to live up to the standards that they have set for themselves. Useful steps to deal with this threat may range from reducing the hype from universities and journals about specific projects, to strengthening collaborations between those involved in fundamental research and those who will put the results to use in the real world."

JOB LINKS

Official LLNL jobs site: careers.llnl.gov

Postdoc listings: www.postdocjobs.com
Academic jobs: www.academickeys.com

Computational modeling jobs: www.psi-k.org

APS Careers in Physics: www.aps.org/careers
Institute of Physics: brightrecruits.com

Nature: www.naturejobs.com

Science and AAAS: sciencecareers.sciencemag.org

Government jobs: www.usajobs.gov/

Industry jobs: www.indeed.com
www.monster.com
sfbay.craigslist.org/jjj/
www.linkedin.com/jobs

OPPORTUNITIES IN INDUSTRY

The Scientist recently released the results of their survey tracking the best companies to work for in industry. Of particular interest is that 6 of the top 10 companies employ less than 175 individuals.

"In many other ways, small companies have not changed over the past decade, especially when it comes to fostering scientific excellence…small companies can also nurture their employees in a way that large companies cannot."

See the full results here:
http://the-scientist.com/2012/06/01/best-places-to-work-industry-2012/

SHIFTING FOCUS

Mayim Bialik is best known as "Blossom," from the 90's sitcom of the same name. Unlike most young stars, however, she followed up this fame with a Ph.D. in neuroscience from UCLA, where her dissertation was titled, "Hypothalmic regulation in relation to maladaptive, obsessive-compulsive, affiliative, and satiety behaviors in Prader-Willi syndrome." A reminder that we should all be open to new and unexpected opportunities and collaborations!

Read the full interview in *Nature*:

http://www.nature.com/nature/journal/v485/n7400/full/nj7400-669a.html

Thriving in your Career
Editorial, March 2012, Nature Photonics

"The most important point is to be enthusiastic about your job. You are far more likely to be successful in a career that you feel passionate about. After all, if you love what you do, what you do doesn't feel like work."

POSTDOC HIGHLIGHTS: NOTES TO THE DIRECTOR

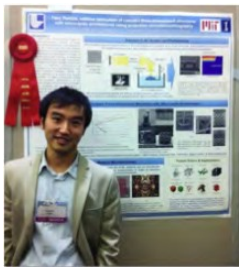
Research provides path for improved biomass processing for biofuels

Production of liquid fuels from plant biomass is a promising technology for reducing greenhouse gas emissions and dependence on fossil fuels. Although sugars stored within the plant cell wall (lignocellulose) could supply most energy needs of the planet, their extraction is difficult and requires chemical pretreatment followed by enzymatic digestion using microorganisms. A possible biomass pretreatment involves the use of ionic liquids; however, residual amounts of ionic liquids are always present in the product of this step, and these chemicals are toxic to the bacteria used in subsequent process steps. In work conducted at the DOE Joint Bioenergy Institute (JBEI), and published online in the May 14, 2012 edition of the journal, *Proceedings of the National Academy of Sciences*, LLNL researchers Michael Thelen, postdoc **Jane Khudyakov**, and Patrik D'haeseleer, together with JBEI colleagues from LBNL, SNL, and JGI describe the discovery of a microbe that is resistant to the toxic effects of an ionic liquid used in biofuel production. Microbes found in natural environments produce efficient enzymes to degrade lignocellulose. "Prospecting" for such organisms is a large part of LLNL's role in JBEI. As part of this effort, Thelen and colleagues isolated the bacterium *Enterobacter lignolyticus* strain SCF1, a lignocellulose-degrading bacterium, from tropical rain forest soils. They found that this strain grows well in the presence of relatively high concentrations of an ionic liquid used for biomass pretreatment, conditions that are toxic to most other bacteria.

Laser Damage Precursors on Fused Silica Surfaces

Surface laser damage limits the lifetime of optics for systems guiding high-fluence pulses, particularly damage in silica optics used for ICF-class lasers such as NIF. The density of damage precursors at low fluence (energy per unit area) has been measured using large beams (1-3 centimeters); higher fluences cannot be measured easily, however, since the high density of resulting damage initiation sites results in clustering. In an *Optics Express article* published on May 4, LLNL researchers report on the development of an automated damage testing station and analysis that make it possible to damage-test thousands of sites with small beams (10-30 microns) and automatically image the test sites to determine if laser damage occurred. For both uncoated and coated fused silica samples, the distribution of precursors nearly flattens at very high fluences, up to 150 joules/cm^2, providing important constraints on the physical distribution and the nature of these precursors. This experimental procedure and analysis can be applied to a wide variety of optical materials to determine their damage behavior over wide fluence ranges. Joining lead author Ted Laurence on the paper were Jeff Bude, postdoc **Sonny Ly**, Nan Shen, and Michael Feit.

Team wins Best Poster Award at 2012 Spring MRS Meeting



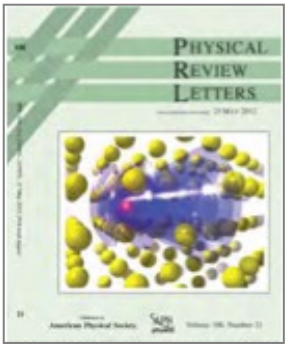
Members of the additive fabrication projection microstereolithography (PμSL) team won a best poster award at the 2012 Spring Materials Research Society (MRS) conference, held at the Moscone Center in San Francisco. The poster, entitled "Fast, flexible, additive fabrication of complex three- dimensional structures with micro-scale architectures using projection microstereolithography," received the award in recognition of excellence in material science research. LLNL coauthors were postdoc **Xiaoyu (Rayne) Zheng** (pictured), Joshua Deotte, Todd Weisgraber, George Farquar, and Chris Spadaccini; collaborating coauthors were from MIT and the University of Illinois at Urbana-Champaign.

POSTDOC HIGHLIGHTS: NOTES TO THE DIRECTOR, CONTD.

LCLS Graphite Experiment poses new questions

In a ground-breaking experiment for plasma physics and ultrafast materials science, LLNL physicist Stefan Hau-Riege and colleagues used the Linac Coherent Light Source (LCLS) X-ray Free-Electron Laser (XFEL) at SLAC National Accelerator Laboratory at Stanford, to heat graphite to induce a transition from solid to liquid and to a warm, dense plasma. This is the first time that an x-ray-irradiated material has been observed to transition to two different states of matter in about 40 femtoseconds. By using pulses of different lengths and looking at the differences in the resulting spectra, the team was able to extract the time dependence of important plasma parameters, such as the electron and ion temperatures and ionization states. One important and surprising finding was that the x-ray fluence needed to disrupt the lattice structure of graphite, and thus degrade the Bragg-peak diffraction data for that lattice, is smaller and the ion-heating rate is faster than predicted by current models for x-ray-matter interactions. Because the rate of energy transfer from the x-ray pulse to the sample is so fast, it may be substantially more difficult than anticipated to achieve one of the "holy grail" applications of XFELs, namely, to obtain diffraction patterns from single biomolecules. The research was published electronically on May 23, 2012 in the journal, *Physical Review Letters*. Other LLNL authors included postdoc **Alexander Graf**, Tilo Döppner, Rich London, Carsten Formann, Siegfried Glenzer, Matthias Frank, and Joe Bradley. In addition to LLNL and SLAC, participating institutions include the Universität Duisburg-Essen; the Max Planck Advanced Study Group, Center for Free Electron Laser Science; the Max Planck Institut für Medizinische Forschung; and the Max Planck Institut für Kernphysik, all in Germany.

Quantum simulations of radiation damage featured on cover of Physical Review Letters



When an energetic particle collides with a solid target, it slows down by transferring energy to the nuclei and electrons of the target material. The result of this interaction is called a collision cascade. For incoming particle speeds that are less than the Fermi velocity of the target, both the nuclear and electronic energy transfers contribute to the "stopping power" of the target. The Born-Oppenheimer approximation, which assumes that electrons adjust instantaneously to moving nuclei (*i.e.*, an adiabatic response), has been the cornerstone for molecular dynamics simulations of radiation-damage processes; however, the actual response of real materials involves non-adiabatic energy exchange between nuclei and electrons. In a paper published in the May 25 issue of *Physical Review Letters*, LLNL's **Alfredo Correa** (recently converted postdoc) and colleagues used time-dependent density functional theory to investigate the effects of non-adiabaticity on the early stages of the development of radiation-damage cascades. They calculated the electronic excitations produced in aluminum metal subjected to bombardment by energetic protons, and modeled what happens to the nuclei of the target material when their electrons are excited by the passage a fast-moving particle. The team found that in the non-adiabatic case, the effect of electronic excitations on the interatomic forces in the aluminum differs substantially from the adiabatic case, demonstrating an important connection between electronic and nuclear stopping that is missing when the Born-Oppenheimer approximation is used. These results reveal new phenomena that occur in the early stages of radiation damage. A full understanding of the processes involved would allow us to manipulate them to our advantage, not only in materials used in nuclear applications, but also for materials relevant to the aerospace industry, and for assessing the effects of radiation on biological tissues.

SELECTED RECENT POSTDOC RESEARCH PUBLICATIONS

Bold = LLNL Postdoc. *Broadcast your achievements! Make new connections & help show how we are doing collectively.*

Guidelines: 1) Peer-reviewed and accepted publications (journal or conference proceedings) only; 2) Your affiliation must be LLNL; 3) Prepare a standard-format citation with all authors (no *et al*), the full title, journal/proceedings info, and a link to the online abstract; 4) Note which authors are LLNL postdocs, and in what division & group; 5) Send all of this to Nathan (kugland1@llnl.gov).

PLS/AEED/Program for Climate Model Diagnosis and Intercomparison:

Zhao, C., S. A. Klein, S. Xie, X. Liu, J. Boyle, and Y. Zhang (2012), Aerosol First Indirect Effects on Non-Precipitating Low-level Liquid Cloud Properties as Simulated by CAM5 at ARM Sites, Geophy. Res. Lett., 39, L08806, 2012. doi:10.1029/2012GL051213. http://www.agu.org/pubs/crossref/2012/2012GL051213.shtml

Zhao, C., S. Xie, S. A. Klein, A. Protat, M. D. Shupe, S. A. McFarlane, J. M. Comstock, J. Delanoe, M. Deng, M. Dunn, R. J. Hogan, D. Huang, M. P. Jensen, G. G. Mace, R. McCoy, E. J. O'Connor, D. D. Turner, Z. Wang, "Toward Understanding of Differences in Current Cloud Retrievals of ARM Ground-based Measurements," J. Geophy. Res., 117, D10206, 2012. doi:10.1029/2011JD016792. http://www.agu.org/pubs/crossref/2012/2011JD016792.shtml

Jeong, S., **C. Zhao**, A. E. Andrews, L. Bianco, J. M. Wilczak, and M. L. Fischer, "Seasonal variation of CH4 Emissions from Central California," J. Geophy. Res., doi: 10.1029/2011JD016896, in press. Accepted Apr 30, 2012 http://www.agu.org/pubs/crossref/pip/2011JD016896.shtml

Zelinka, Mark D., Stephen A. Klein, Dennis L. Hartmann, "Computing and Partitioning Cloud Feedbacks Using Cloud Property Histograms, Part I: Cloud Radiative Kernels," J. Climate, 25, 3715–3735, 2012. doi: http://dx.doi.org/10.1175/JCLI-D-11-00248.1

Zelinka, Mark D., Stephen A. Klein, Dennis L. Hartmann, 2012: Computing and Partitioning Cloud Feedbacks Using Cloud Property Histograms. Part II: Attribution to Changes in Cloud Amount, Altitude, and Optical Depth. J. Climate, 25, 3736–3754. doi: http://dx.doi.org/10.1175/JCLI-D-11-00249.1

PLS/CMMD: M. T. Myers, **S. Charnvanichborikarn**, L. Shao, and S. O. Kucheyev, "Effect of the surface on ion-beam damage build-up in ZnO," Scripta Mater. 67, 65 (2012). http://dx.doi.org/10.1016/j.scriptamat.2012.03.021

PLS/CMMD: **S. Charnvanichborikarn**, M. T. Myers, L. Shao, and S. O. Kucheyev, "Interface-mediated suppression of radiation damage in GaN," Scripta Mater. 67, 205 (2012). http://dx.doi.org/10.1016/j.scriptamat.2012.04.020

PLS/Physics: **M. I. Buchoff**, T. C. Luu, and **J. Wasem**, "S-wave scattering of strangeness -3 baryons," Phys. Rev. D **85**, 094511 (2012) http://link.aps.org/doi/10.1103/PhysRevD.85.094511

PLS/Physics/Optical Sciences: Guyon, Olivier; Bendek, Eduardo A.; Eisner, Josh A.; Angel, Roger; Woolf, Neville J.; Milster, Thomas D.; **Ammons, S**. Mark; Shao, Michael; Shaklan, Stuart; Levine, Marie; Nemati, Bijan; Pitman, Joe; Woodruff, Robert; and Belikov, Ruslan. 2012, "High-precision Astrometry with a Diffractive Pupil Telescope," Astrophysical Journal Supplement, 200, 11, 2012. http://adsabs.harvard.edu/abs/2012ApJS..200...11G

PLS/Physics/Optical Sciences: Wong, Kenneth C.; **Ammons, S**. Mark; Keeton, Charles R.; and Zabludoff, Ann I. 2012, "Optimal Mass Configurations for Lensing High-redshift Galaxies," Astrophysical Journal, 752, 104, 2012. http://adsabs.harvard.edu/abs/2012ApJ...752..104W

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